

Attachment 6

Monitoring, Assessment, and Performance Measures

The nine projects included in this grant proposal each contribute to addressing the seven goals and 57 objectives of the Greater Monterey County IRWM Plan. As the projects are implemented and data is generated, that information will be tracked to evaluate progress made toward achieving Plan objectives and regional water quality and conservation goals.

The Regional Water Management Group will conduct a Plan Performance Review approximately every two years. A Plan Performance Matrix will be used to list projects implemented through the IRWM Plan and demonstrate how (and the extent to which) each project carries out each objective of the IRWM Plan. The matrix will be populated by the “Conservation Action Tracker” database, which is a new data system being implemented by the Central Coast Resource Conservation Districts (RCDs) and project partners of the Greater Monterey County IRWM Plan. The Conservation Action Tracker is an online tool that allows project proponents to register and update information on conservation projects across the region in order to track efforts and improve stakeholders’ ability to evaluate collective impacts and effectiveness.

Each of the monitoring plans for the projects included in this application is consistent with the data management requirements outlined in the IRWM Plan. The Plan’s data management system takes advantage of database systems developed by statewide efforts including, for surface water quality, those developed by the California Surface Water Ambient Monitoring Program (SWAMP) and by the California Environmental Data Exchange Network (CEDEN). Wetland and riparian habitat conditions will be measured and documented using the California Rapid Assessment Methods (CRAM). Groundwater data will reside in GeoTracker using the Groundwater Ambient Monitoring and Assessment (GAMA) database. All projects that involve surface water quality, groundwater quality, and/or that involve wetland restoration must meet the criteria for and be compatible with the State guidelines for those database systems; in addition, all projects that involve wetland restoration must meet the criteria for and be compatible with the State Wetland and Riparian Area Monitoring Plan (WRAMP).

Through a combination of the Plan Performance Matrix and the Conservation Action Tracker, the Regional Water Management Group will track over time how the projects implemented through IRWM Implementation Grant funds (and other grant funds) are contributing to addressing the goals and objectives of the IRWM Plan, as well as regional water quality and conservation goals.

The following describes the monitoring plans, assessments, and performance measures for each of the nine projects contained in this proposal.

Project 1. County of Monterey: San Lucas Water District Public Water Supply Project

The overall goal of the San Lucas Water District Water Supply Project is to eliminate nitrate and TDS contamination in the San Lucas Water District public water supply on a long-term sustainable basis in order to achieve a long-term potable public water supply consistent with requirements of State law for public water systems. The project will be implemented by the County of Monterey with the cooperation from the San Lucas Water District. Once the project is constructed, the San Lucas Water District will conduct ongoing sampling and testing of the public water supply per State law.

In order to achieve the goal of securing a long-term potable public water supply for the community of San Lucas, the project will implement preparation of a Feasibility Study to evaluate all available feasible options for long-term solutions to the water supply problem and identify a Preferred Option. Preliminary engineering analysis of the Preferred Option will be completed, leading to preparation of a Project Description and a CEQA Initial Study. Upon completion of the CEQA process, final engineering plans, specifications, and bid documents will be completed and permits and rights-of-way will be obtained. The County and District will then advertise for bids and construct the project. Project performance for these various steps will be measured by the completion of the various analyses, studies, and plans. Approval of plans and permits will also be measurable indicators of a successful outcome of the project, as will the actual finished construction of the project.

Project 1. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Conduct preliminary studies, leading to a Preferred Option	Complete technical studies and analysis of water supply replacement options under consideration for the community, resulting in a Preferred Option.	Evaluation of hydrology and geotechnical conditions for selected options by Monterey County, San Lucas Water District, and water resource agencies.	Completed hydrology study, geotechnical studies distributed and comments considered.	Completed hydrology, geotechnical and any related studies submitted to Monterey County, San Lucas Water District, and Monterey County Water Resource Agencies (MCWRA), and resulting Preferred Option.
Develop a Project Description and complete CEQA, engineering plans, specifications, permitting, and rights-of-way.	Secure CEQA, water supply development and other approvals for selected project. Complete engineering and specifications.	Complete CEQA Initial Study. Complete permitting and approval process for selected project. Complete engineering and specifications.	Completed CEQA studies. Completed applications and submit to regulatory agencies for approvals. Completed engineering plans and specifications.	CEQA and permit documents submitted to DWR for review and approval. Engineering plans and specifications submitted to DWR.
Construction of new facility.	Successful completion of new water supply facility for community of San Lucas.	Meet scheduled deadlines for construction.	Whether or not the facility has been designed, built and tested in the appropriate timeframe.	Bid documents, invoices, photodocumentation of the facility submitted to DWR.
Eliminate nitrate and TDS contamination in San Lucas Water District public water supply on a long-term sustainable basis.	Long-term potable public water supply consistent with requirements of State law for public water systems.	Water quality requirements for public water supply per State law.	All water quality constituents are within parameters set forth in State law.	Ongoing sampling and testing of public water supply per State law.

Project 2. Pajaro/Sunny Mesa Community Services District: Springfield Water Project

The Pajaro/Sunny Mesa Community Services District (PSMCSD) Springfield project involves technical studies, feasibility analysis, design and other predevelopment activities that will result in a replacement water supply for a disadvantaged community and design planning at 90% submitted for approvals. Performance under the grant will be measured by the completion of studies, completion of the feasibility analysis including evaluation of system consolidation, selection of a preferred option, and design work. Approval of plans and permits will be measurable indicators of a successful outcome of the project. Results of hydrology, geotechnical studies and water tests will be made available to the Pajaro Valley Water Management Agency and Monterey County Water Resources Agency and to the Drinking Water Program administered by the Monterey County Environmental Health Division in accordance with standard quarterly reporting protocols. Springfield residents receive annual Consumer Confidence Reports regarding water quality and Notices of Violation, including the Bottled Water Order issued by the County of Monterey. Drinking Water system reports regarding violations are additionally available through the California Department of Public Health (CDPH) and can be found on the CDPH website.

Project 2. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Develop a plan for Springfield DAC replacement water supply.	Complete technical studies and analysis of water supply replacement options under consideration for the community.	Evaluation of hydrology and geotechnical conditions for selected options by PSMCSD engineer, District and water resource agencies.	Completed hydrology study, geotechnical studies distributed and comments considered.	Completed hydrology, geotechnical and any related studies submitted to Pajaro Valley Water Management Agency and Monterey County Water Resource Agencies (MCWRA) and Monterey County.
		Evaluation of test well water supply and quality.	Water supply production tests and water quality sampling and lab testing completed.	Water quality tests and production reports submitted to Monterey County Environmental Health, Drinking Water Program (EH) by third party lab per EH protocols.
	Assist in selecting preferred project and develop design to 90% completion.	a. Analyze technical reports and prepare recommendations for PSMCSD. b. Preliminary Design Cost Estimate prepared.	a. Completed Engineer Report and Cost Estimate. b. Design to 90% Plans completed.	a. Completed Engineer's Cost Estimate submitted to DWR. b. Completed plans submitted to County (EH) for interdepartmental review and approval.
	Complete technical and financial feasibility analysis of project including consolidation options.	Achieve consensus with PSMCSD and consultants regarding technical reports and cost estimates.	Complete draft report and incorporate and circulate to stakeholders and incorporate comments and recommendations.	Feasibility Report approved by PSMCSD and submitted to DWR.

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
	Secure CEQA, water supply development and other approvals for selected project.	Complete CEQA Initial Study.	Complete CEQA studies and assist County to process approvals.	CEQA documents submitted to DWR for review and approval.
		Complete permitting and approval process for selected project.	Complete applications and submit to regulatory agencies for approvals; coordinate multi-agency review processes.	Permits submitted to DWR.

Project 3. City of Salinas and Monterey Regional Water Pollution Control Agency: Dry Weather Runoff Diversion Program

Urban water runoff from the City of Salinas (City) currently flows to receiving waters untreated. Water from south Salinas flows into the Salinas River via a series of stormwater conveyance pipes. The remainder of the City drains into the Reclamation Ditch. Water carries with it pollutants from a number of point and non-point urban and agricultural sources. Left untreated these pollutants can adversely affect downstream environments.

The City desires to reduce pollutant discharges to surface waters to the maximum extent practicable. The City has reviewed opportunities and has identified two opportunities to accomplish this goal. For south Salinas, the City proposes to divert dry weather flows and potentially accept first-flush storm-generated flows, and flows from infrequent smaller storms into a small earthen detention basin to utilize biological processes in mitigating pollutants. The drainage water from the detention basin would then be diverted into a force main that flows to the Monterey Regional Water Pollution Control Agency (MRWPCA) wastewater treatment plant (WWTP) in Marina. Flows would combine with raw sewage from the City. MRWPCA would treat the combined flows to tertiary standards and pump it through an existing recycled water distribution system in northern Monterey County. The recycled water is currently used to irrigate croplands, substantially reducing the need to pump groundwater for irrigation in a seawater intrusion-affected area.

A second opportunity includes a diversion facility in north Salinas. The City and MRWPCA plan to study north Salinas, to determine if acceptable water quality and stormwater flows could be diverted into the sanitary sewer system, also a tributary to MRWPCA's wastewater treatment plant, to further add to the recycled water production for agriculture in northern Monterey County.

Monitoring of both sites (south Salinas and north Salinas) will occur by installing flow meters to determine how much water might be available, and automatic water quality samplers. Analyzing the water samples for appropriate constituents and preparing a report describing such work will be completed. This component will help determine if and how the City should proceed with diversions of flow from the Reclamation Ditch into the sanitary sewer system.

Monitoring protocol will include regulatory approved quality control and assurance methods for collection, transport and analysis as well as entering and storing the data into an internal database. The database will mimic other monitoring data storage models MRWPCA has utilized for submitting reports to several regulatory agencies and/or requested by other interested parties. MRWPCA databases are maintained using Excel; it has an impeccable track record with regulatory agencies for quality and quantity of data submitted. MRWPCA is a joint powers public agency which is subject to public record act requests. MRWPCA routinely provides similar information through its website. An example of MRWPCA's web-based data reports can be viewed at: <http://www.mrwPCA.org/recycling/chem2013.php>.

Overall project goals include construction of the infrastructure to divert dry weather runoff, and as a result of that construction, improved surface water quality in the Salinas River and an increased recycled water supply for agricultural irrigation. Other goals of the project include gathering sufficient data to understand performance of the system and to determine whether or not the project should be expanded to north Salinas. These goals are outlined in the table below.

Project 3. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Construction of infrastructure to divert dry weather runoff.	Completion of diversion facilities to transfer and ultimately treat dry weather urban runoff	Meet scheduled deadlines for construction and testing equipment.	Whether or not the diversion facilities have been designed, built and tested in the appropriate timeframe.	Testing results, photodocumentation of completed infrastructure
Reduce pollutant discharges from entering Salinas River from City outfalls.	Improved surface water quality.	A notable reduction of pollutant loading reaching the Salinas River.	Percent change in pollutants, as indicated in report detailing the amount of pollutants entering the system and percentage reduction of pollutants by the use of the diversion facility.	Analyses of water quality data and trends: Measure volumes of water entering the system prior to the diversion facility and volumes exiting the Salinas outfall.
Increase recycled water supply for agricultural irrigation.	Supply of additional water via the diversion facility to be treated at the regional plant for irrigation reuse on food crops.	40 AF of dry weather urban runoff diversion is the target amount to divert each year.	The amount of water moved by the Salinas Pump Station during the dry season. An increase in the amount of water moved during the dry season translates into more water available for reuse.	Verify information from the flow meters and compare to pump station flow meters to determine exact amounts of water moved through the system.
Determine the quantity and quality of water entering the Blanco detention basin via the south Salinas stormwater conveyance system.	Measurement of volumes of water entering the system and identification of certain constituents in the water for protecting receiving water quality and providing a new source of water for reuse purposes.	Flows – Data for dry weather flows (average daily, monthly) and seasonal events (first flush, small events, and possible large events). Water Quality – Sufficient data to assess influent and effluent water quality and compare to historical agronomic recycled water quality standards in addition to the numeric regulatory standards.	Flows – Data that shows the capacity of the detention basin for maximum effectiveness and volume. Data that will allow us to determine an actual amount of water diverted for beneficial use. Water Quality – Data that will allow us to determine influent water quality, and whether detention basin water quality is equal to or better than existing recycled water measurements.	Flow – Cubic feet per second or gallons per minute to be cataloged in a database for establishing benchmarks and further analysis at a later time. Water Quality – Parts per million or mg/L and cataloged in a database for establishing benchmarks and further analysis at a later time.
Determine the flow quantity and quality of water in the Reclamation Ditch near the exit point of Salinas city limits	Measurement of volumes of water exiting the system and identification of certain constituents in the water for protecting receiving water quality and providing a possible	Flows – Data for dry weather flows (average daily, monthly) and seasonal events (first flush, small events, and possible large events). Water Quality – Sufficient data to assess	Flows – Measurements for dry weather flows and future wet weather events. Data that will allow us to determine an actual amount of water that could be diverted for beneficial	Flow – Cubic feet per second or gallons per minute to be cataloged in a database for establishing benchmarks and further analysis at a later time. Water Quality – Parts per

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
(Rossi Street).	new source of water for reuse purposes.	water quality and compare to previous sampling events and recycled water parameters and existing numeric regulatory standards.	use. Water Quality –Data that will allow us to examine existing receiving water quality parameters and compare against previously sampled Rec Ditch data for water quality differences.	million or mg/L and cataloged in a database for establishing benchmarks and further analysis at a later time.
Determine whether stormwater in north Salinas can be diverted to the regional wastewater treatment plant.	Understanding of the amount of water available and quality of the water from City outfall contributions for possible diversion during in the dry weather season.	Identification of the obstacles (quality, quantity and rights) for diverting the water into existing wastewater conveyance lines for treatment at the regional facility.	Measurements for dry weather flows and water quality measurements as compared with previously sampled Rec Ditch data.	Verify the accuracy of the flow meters by periodic performance testing and compare water quality objectives of tested water to known values.

Project 4. Resource Conservation District of Monterey County: Salinas River Watershed Invasive Non-native Plant Control and Restoration Program

The Salinas River Watershed Invasive Non-native Plant Control and Restoration Program, implemented by the Resource Conservation District of Monterey County (RCDMC), will be monitored by personnel from the principal project partners: RCDMC, DENDRA, Inc. and the Central Coast Wetlands Group (CCWG). The goal of the project is to improve habitat quality, channel conveyance capacity, enhance recharge, and reduce unnatural bank erosion by treatment of 120 net acres of the noxious riparian weed, *Arundo donax*, and strategic revegetation with native plants in the channel of the Salinas River and nearby tributaries in the vicinity of King City and downstream towards Soledad. Performance measures will focus on effectiveness of weed treatment and revegetation in terms of reduction of weed cover and increase in native vegetative cover, changes in habitat quality on the river at treatment sites and elsewhere, and changes in sediment accumulation associated with the removal of arundo. Project site-specific vegetative cover (weed vs. native) data will be collected and maintained by RCDMC with DENDRA, Inc., and entered into an Excel database. Habitat quality and sediment monitoring data will be collected by CCWG and stored in a database of similar format to the State CEDEN database. The different monitoring methods are described in more detail below.

Along with guidance from technical consultants at the County Agricultural Commissioner's Office, CCWG, and DENDRA, Inc., the RCDMC will use the Monterey County Weed Management Area as a technical review committee to evaluate project progress and effectiveness in order to inform an adaptive management approach that would result in changes in method or technique as needed for the best effect on channel habitat and weed control. Such meetings will occur each year of the project, with direct feedback from landowners, the County, and DENDRA occurring on a more frequent, ad hoc basis.

Monitoring Methods

Treatment and planting survival:

1. *Effectiveness of herbicide treatment.* Percent cover of arundo re-sprouts will be measured along the 50m transect line, and re-sprouting arundo canes are counted in a 1m belt.
2. *Survival and condition of native plantings.* Plantings will be recorded in a 5m x 50m belt and their condition recorded: good (no die back), fair/poor (die back but some active growth or re-sprouting) and dead (no live growth or green buds). Tabulations are summarized by species.
3. *General success of restoration.* A photo point will be established at each site to document pre-treatment conditions and post-treatment recovery.
4. *Vegetation cover.* A 50m transect line will be laid out and canopy cover data collected along the transect line (recording where the plant canopy intercepts the transect line). For example: 3.4m to 3.9m of mulefat canopy would equal 0.5 m of canopy crossing the line. Each plant's cover is recorded by species along with height and a notation if native plants were pre-existing or planted.

Vegetation and Habitat Monitoring

CRAM Assessments:

CCWG will conduct California Rapid Assessment Method (CRAM) assessments at 20 locations prior to treatment and at the end of the project. Additionally, they will conduct an ambient assessment of 30 locations along the entire stretch of the long-term invasive plant removal program to get a baseline condition of the river. The CRAM is a monitoring system called for in the IRWM Plan for projects that involve wetland improvement and restoration. CRAM uses four attributes (buffer and landscape context, hydrology, physical structure, biotic structure) consisting of 14 metrics and submetrics (for example buffer condition, channel stability, structural

patch richness, topographic complexity, percent plant invasion) to assess the overall health of a wetland and riparian system. A CRAM assessment involves two trained practitioners going out to assess a stretch of creek ranging from 100-200m in length.

Sediment Monitoring:

CCWG and California State University Monterey Bay (CSUMB) faculty will conduct cross-sectional profiles of 10 locations along the project area in year one and year three of the project. The data will be used to quantify the effect of arundo removal on sediment transport in the main stem of the Salinas River. The channel and the surrounding floodplain will be surveyed using a Riegl LMS Z210 terrestrial laser scanner. A series of several high resolution scans will be conducted from locations along the right and left bank using the field laser attached to a toughbook computer. Survey control will be facilitated by the RiScan-Pro survey software package, capable of visualizing point cloud data in the field.

The resultant meshed set of laser scans will be manually clipped within the RiScan-Pro software to remove unwanted information such as distant points and any spurious aerial data points returned from aerosols or water droplets. Further refinement of the individual scan data points will then be conducted using the POLYWORKS post-processing software package.

Data capture will take place on two occasions, once at the beginning of the project and once in year three or after a geomorphologically effective flow event.

Project 4. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Arundo treatment on 120 acres	Complete treatment	>95% control in treated stands	Percent of live vs. dead canes in treatment areas	Counts of live canes on 50m x 1m plots post-treatment
Revegetation on 10 acres	Native vegetation on treated sites	200 live plants per acre of planted native cuttings	Plant condition counts	Surveys of live vs. dead plant counts on 50m x 5m plots in year 3
Improved wildlife habitat	Normalization of vegetation structure and composition that does not impede wildlife and that provides greater resources (structure and food resources)	Arundo removal is expected to improve the Biotic Attribute score in CRAM by between 5-25%. This will lead to an improvement in overall CRAM score by up to 6%.	Comparison of before and after photos, and pre- and post-project CRAM scores	CRAM (assessments at 10 project sites done before and after implementation); photo monitoring
Reduced flooding potential	Removal of arundo stands that reduce channel capacity and trap sediment at project sites	Reduction of >95% of arundo stand volume and increase in stream profile if >10 year hydrologic event occurs (sediment movement)	Increased channel capacity	Mapped footprint of arundo stands and calculated restored volume; laser survey of channel cross-sections
Program viability	Landowner participation and investment	\$25,000 in landowner match to program in labor and equipment	Projects conducted under RCDMC permits by private landowners under their own funding	Records of self-funded work and other landowner communications

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
	Public investment for future stages	Funding for next stage acquired prior to completion of grant funding	Grant awarded for next stage	Documentation of grant award

Project 5. Resource Conservation District of Monterey County: Monterey County Farm Water Quality Assistance Program

The Resource Conservation District of Monterey County (RCDMC), in close partnership with University of California Cooperative Extension (UCCE) Crop Advisors and USDA Natural Resources Conservation Service (NRCS), will provide a bilingual on-farm erosion, irrigation, and nutrient management evaluation program for Monterey County farmers. The service will 1) evaluate erosion potential, irrigation system and application efficiency, and nutrient budgeting; 2) develop recommendations as needed for field configuration, soil stabilization, and refined water and nutrient applications; 3) assist growers' voluntary implementation of those recommendations to help reduce excess soil, water and nutrient movement off area farms while optimizing farm productivity; and 4) monitor and verify the effectiveness of the implemented management changes and practices.

The project will be monitored by both RCD and UCCE personnel. The monitoring methods, including the data management, will adhere to those of UCCE, which has long demonstrated successful monitoring and data management. Depending upon the monitoring or assessment technique used, data will be recorded either by hand to be entered into Excel spreadsheets or downloaded into Excel from field dataloggers for incorporation into Excel spreadsheets for analysis. Data are entered and QA/QC'd within a month of data collection.

While individual results of practice effectiveness will be shared with the participating landowners, all project results data will be tabulated and presented for review by a project technical review committee to evaluate project progress. This informs an adaptive management approach that would result in changes in method or technique as needed for the best effect on farm water and nutrient management efficiency. Such meetings will occur each year of the project, with direct feedback from growers, commodity groups, and UCCE occurring on a more frequent, ad hoc basis.

Performance measures to quantify and verify project performance will include those of physical performance, community impact, and program viability. Physical performance measures will include irrigation water use efficiency (in terms of applied water relative to calculated crop water need), nutrient use efficiency (in terms of application rate relative to crop needs), and reduced sediment loss from erosion control sites (in terms of observed erosion relative to anticipated no-project conditions). We will assess community impact through surveys of those receiving information and assistance regarding the perceived benefit, and whether they have or intend to use the information on their farms. We will assess program viability in terms of cost-benefit review of implemented practices, industry and commodity groups participation, and our ability to acquire or arrange means for continuity of the program beyond the grant period.

Project 5. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Improve local surface water quality	Area growers more closely match irrigation water applications to crop water need, resulting in an overall reduction in water use and excessive leaching	10% improvement in water applied relative to CIMIS-estimated crop need on project treatment sites, with estimates of total volume of reduced use and cost savings	In-field irrigation management evaluations conducted according to Standard Operating Procedures refined by UCCE INM specialists.	Manual pressure readings, manual and datalogger-tracked flow readings from in-line flowmeters, catchcup samples, physical flow measurements, visual assessments of irrigation systems

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
	Area growers more closely match nitrogen fertilizer applications to crop need, resulting in reduced potential loss of nitrates to groundwater and local waterways	30% reduction in nitrate fertilizer applications on project treatment sites, with estimates of total volume of reduced use and cost savings	In-field nutrient management evaluations	Lab analysis of soil and water samples, in-field nitrate quick test of soil samples, grower communication regarding nutrient application rates
	Area growers effectively stabilize soil on their lands, reducing erosion to natural, background rates, keeping soil and attached agrichemicals from reaching local waterways	>5 tons of soil erosion per acre prevented on project sites	Photodocumentation and physical measurements of erosion and deposition	Physical measurement of voids (gullies, rills) and deposits of sediment; erosion estimation tools such as Revised Universal Soil Loss Equation for estimations of no-project erosion rates
Increase local farmers' awareness of water quality improvement measures, their importance, and means for implementing them	Area farmers participate in the program	50 farmers participate in on-farm evaluations and 20 farmers implement BMPs with program assistance	Records of communication with cooperating growers to document management practice changes and opinions/perceptions regarding practice implementation	Records of management practice changes, tabulated to document program impact; number of acres treated
	Farmers not participating in the program implement practices independently to benefit water quality	At least 20 non-participating farmers indicate they have implemented BMPs in part due to program education or outreach	Degree of self-funded implementation by growers outside of grant. Extent of industry/commodity group support and/or participation.	Survey of workshop participants regarding educational impact in terms of potential and actual independent implementation of conservation methods
Build a sustainable program valued by growers and industry	Participating growers consider implemented BMPs cost-effective for their operations	On-farm project benefits outweigh costs	Records of project costs vs. cost savings and estimations of environmental and reduced regulatory burden benefits	Cost-benefit analysis of practices implemented
	Local ag industry and commodity groups actively participate in and support program	Ag industry and commodity groups co-sponsor ag water quality outreach and education efforts	Number of events and documents developed in partnership with industry	Records of events and surveys of industry groups
	Continued support for program beyond grant term	New funding sources for RCD program or collaborative program developed before completion of grant term	Grant or contracts awarded; or new, collaborative program in place	Documentation of contracts or program plans

Project 6. Ecology Action: Monterey Bay Green Gardener Training & Certification Program

The Green Gardener Certification Program teaches a comprehensive approach to watershed management in the landscape. Green Gardener training participants are either home gardeners, self-employed maintenance gardeners and/or employees of licensed landscape contractors, school districts or public agencies. Green Gardener 10-week certification-level course topics include efficient irrigation system design and management, applying mulches and compost to build the soil food web, improving water retention capacity of soil and preventing erosion, drought-tolerant plant selection and natural landscaping based on plant communities in a watershed, integrated pest and weed management strategies that reduce pesticide applications in the landscape, fertilization practices that protect water quality, and natural pruning and plant selection practices that reduce green waste and carbon emissions. In addition to the certification level course, the Monterey Bay Green Gardener program offers hands-on public workshops on water-wise landscaping, irrigation efficiency retrofits, laundry-to-landscape graywater irrigation, and low impact development (LID) practices that slow, spread, and sink stormwater.

The Monterey Bay Green Gardener Program will monitor and evaluate the program's impact on participant's landscaping practices outside of class with standard pre-and post training evaluation surveys that were developed and tested with funding from the NOAA B-WET grant program of the Monterey Bay National Marine Sanctuary. Students will be provided with a pre-training survey before beginning a Green Gardener training series or workshop. Pre-training surveys will provide the program with an assessment of participants' knowledge and practices before completing Green Gardener training. A post-training survey (identical to the pre-training survey) will be administered by phone or e-mail to each training participant three months after completing training. Pre-and post-training results will provide measurable data that will indicate if the training was effective in changing specific landscaping practices that relate back to Green Gardener program desired outcomes and learning objectives.

Project 6. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Reduce landscape water demand from groundwater resources and reduce urban non-point source pollution in the landscaping industry	<p>Green Gardener program participants will:</p> <ul style="list-style-type: none"> • Conduct walk-through evaluations of irrigation systems and make repairs to prevent run-off at least 4x/year. • Consider hydrozones, slope, soil texture, plant water requirements, distribution uniformity, and precipitation rates when programming an irrigation schedule. • Adjust the irrigation schedule monthly based on current weather or use a weather-based controller. • Install CA native or drought-tolerant plants. • Replace the use of soluble nitrogen fertilizers with slow-release or natural fertilizers. • Use horticultural and physical controls in an IPM program. • Use less-toxic pesticides. • Install LID BMPs in landscapes such 	<ul style="list-style-type: none"> • 80% of Green Gardener certification training and workshop participants will implement two or more landscape water conservation and/or water quality protective practices after completing training. • Water-wise demonstration sites will reduce landscape water demand by 30% and/or maintain a landscape 	<ul style="list-style-type: none"> • 25 landscape industry workers from the Salinas Valley will become Certified Green Gardeners. • 100 Salinas Valley residents will participate in bilingual Green Gardener LID and laundry-to-landscape greywater irrigation system workshops. 	<ul style="list-style-type: none"> • Pre-and post-training evaluation surveys of program participants. • Analysis of pre-and post installation water use records from metered water-wise demonstration sites. • Pre-and post installation photo documentation of water-wise demonstration sites.

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
	<p>as native or natural vegetation, downspout diversion to rain gardens or bioswales, permeable hardscapes, and rainwater harvesting.</p> <ul style="list-style-type: none"> • Install a code-compliant laundry- to- landscape greywater irrigation system after completing a workshop. <p>Four training demonstration sites will be designed and installed to provide current and future participants hands-on experience and practice with efficient irrigation methods.</p>	water budget that is 70% of ETo.		

Project 7. Elkhorn Slough Foundation: Ridgeline to Tideline - Water Resource Conservation in Elkhorn Slough

The Ridgeline to Tideline Project, implemented by the Elkhorn Slough Foundation, is a comprehensive approach to addressing water resource issues in an estuarine watershed. The project area encompasses 359 acres of Elkhorn Slough and uplands set in a 4,000-acre block of protected lands. The three stages of this project include: 1) planning, design, and environmental compliance for increasing tidal range and circulation in North Marsh—a part of the Slough with consistently poor water quality and greatly reduced estuarine function—and restoring an adjacent upland buffer, 2) acquiring adjacent farmland property that is a chronic source of Slough degradation, and 3) restoring a nearby marsh through the addition of sediment.

The Ridgeline to Tideline project will be monitored by permanent staff of the Elkhorn Slough National Estuarine Research Reserve (ESNERR). The monitoring methods, including the database structure, will adhere to models of demonstrated successful monitoring and data management dissemination, based on the currency of peer-reviewed publications by our own scientists or by other experts in the field. Our water monitoring data are submitted to the statewide CCAMP database and the national NERR Central Data Management Office. ESNERR is committed to robust data archiving, sharing, and dissemination. Our environmental databases are maintained using Excel, Access, or ArcView software as appropriate to the data type. We ensure that two different permanent staff members have copies of and are familiar with all the methodological databases, metadata, and databases for our monitoring programs. Data are entered and QA/QC'd within a month of data collection. We make all our raw data available to any requestors. We also prepare timely analyses, with graphs and summaries, and make these available through our webpages and present them at regular meetings of the Tidal Wetland Project. As an example of our web-based dissemination of data and reports, please see http://www.elkhornslough.org/research/conserv_marsh.htm, which was the result of a previous grant-funded project. ESNERR scientists work at the interface of academic and applied science, working closely with land managers and decision-makers while regularly publishing in peer-reviewed journals (e.g., Gee et al. 2010, Wasson 2010, Watson et al. 2011, Wasson and Woolfolk 2011, and Hughes et al. 2011). We will publish the results of the restoration monitoring for this project in an international journal, to share lessons learned and data with the broader estuarine science community.

Project 7. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Protect groundwater supplies	Decrease local groundwater use by ~ 230 acre/feet/year [see Technical Justification for conversion used to calculate groundwater reduction].	Reduce local pumping of groundwater by retiring 55 acres of farmland uphill of North Marsh, and retiring 40 acres of farmland on CDFW's Minhoto parcel	Acreage of farmland taken out of production	Remote sensing and GIS analysis to quantify acreage of farmland converted to open space
Improve estuarine water quality	Reduce agricultural erosion and associated pollution by retiring farmlands on steep slopes adjacent to estuarine waters.	Decrease NO ₃ , NH ₃ , and PO ₄ concentrations in estuarine waters downhill of target farmland, by up to 50-70%.	Concentrations of NO ₃ , NH ₃ , PO ₄	ESNERR Volunteer Monitoring Program which has collected surface samples downstream of site for past 20 years; data are submitted to statewide CCAMP database and will be used for a BACI analysis to detect improvements in water

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
				quality at this site vs. control sites, before and after project completion.
	Restore salt marsh at CDFW's Minhoto property, promoting sediment.	Promote sediment deposition on newly restored marsh (3-6 mm/year).	Sediment accumulation rate on the newly created marsh.	We will install Surface Elevation Tables and feldspar horizon markers to document sedimentation rates on the new marsh, consistent with national NERR sediment monitoring protocols.
Protect groundwater water quality	Decrease local groundwater use by ~ 230 acre/feet/year [see Technical Justification for conversion used to calculate groundwater reduction].	Help prevent seawater intrusion by reducing local pumping of groundwater by retiring 55 acres of farmland uphill of North Marsh, and retiring 40 acres of farmland on CDFW's Minhoto parcel.	Acreage of farmland taken out of production.	Remote sensing using aerial photography and GIS analysis to quantify acreage of farmland converted to open space.
	Decrease local fertilizer use by ~ 18,300 lbs N/year where farmlands are retired [see Technical Justification for conversion of this metric to fertilizer use reduction]	Reduce risk of groundwater contamination by nitrates, by retiring farmland and reducing fertilizer applications.	Same as above.	Same as above.
Develop and fund integrated watershed approaches to flood management through collaborative and community supported processes	Develop a project at North Marsh that improves water management infrastructure, thereby 1) protecting the railroad and public road from the effects of tidal flooding, 2) enhancing natural ecological and hydrological functions of an estuary, and 3) improving public safety and recreation in the area.	Develop project plans to improve tidal circulation in North Marsh. Products will include: site assessment; notes from meetings with staff, agencies, other stakeholders and neighbors; design alternatives; a completed restoration plan; 30% designs; and CEQA documents.	There are no direct performance indicators to be monitored for this component beyond completion of the elements described to the left, but we will incorporate long-term ESNERR data on water quality, habitat change, native oyster recruitment and survival, and waterbird abundance in the planning effort.	ESNERR's extensive long-term monitoring will inform process.
Implement approaches to flood management	Reduce agricultural runoff during storm events by retiring 55 acres of farmland on property targeted for acquisition uphill of North Marsh	Protect a 500-foot section of Elkhorn Road directly downstream from targeted property from sedimentation during storm events.	Sediment removal events on this stretch of road.	Document number of sediment removal events required following construction; anticipate number to be zero.

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
	Implement project to protect and restore ecological and hydrological functions of an estuary. Salt marshes can reduce wave energy by over 50%.	Restore 7 acres of salt marsh at CDFW's Minhoto property adjacent to 0.75 miles of upland, providing flood protection to ~10 acres of transitional upland habitat.	Acreage of salt marsh restored.	Remote sensing using aerial photography and GIS analysis to quantify acreage of new salt marsh in project area.
Protect and restore the region's ecological resources	Reduce adverse impacts of sedimentation into estuarine habitat.	Protect historical salt marsh in North Marsh from burial by agricultural sediments originating from farmland targeted for acquisition and changed land use.	Rate of habitat conversion due to sedimentation.	Remote sensing using aerial photography and GIS analyses to quantify rate of conversion of salt marsh to willow grove, which has been significant in past but is anticipated to drop to near zero following project.
	Reduce high priority invasive species.	Remove invasive eucalyptus and iceplant from 2.5 acres of upland/ecotone adjacent to tidal wetlands at North Marsh.	Acreage of eucalyptus and iceplant at project sites.	Field GPS measurements of perimeter before/after restoration activities to document decrease.
	Restore salt marsh.	Restore 7 acres of salt marsh at CDFW's Minhoto property.	Acreage of salt marsh restored.	Remote sensing using aerial photography and GIS analysis to quantify acreage of new salt marsh in project area.
	Enhance federally listed species and their habitats.	Restore 7 acres of salt marsh at CDFW's Minhoto property. Loss of salt marsh in Elkhorn Slough has been implicated in the local extinction of the federally endangered California clapper rail. Salt marshes have also been documented to provide important resting and foraging habitat for the federally threatened southern sea otter mothers and pups in Elkhorn Slough.	Number of sea otters using area.	Conduct otter counts in three sites within project area vs. three control areas and analyze findings in BACI design, to document increase in otters in newly restored tidal creek/salt marsh complex.
Promote regional communication and cooperation regarding water resource	Increase stakeholder input in plans to improve water quality, flood management, and coastal conservation.	Involve Union Pacific Rail Road, Monterey County Public Works and Mosquito Abatement, the Moss	There are no performance indicators to be monitored beyond completion of the elements described to	

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
management.		Landing Harbor District, permitting agencies, scientists, neighbors and consultants in planning for tidal circulation improvements at North Marsh. Products will include: site assessment; notes from meetings with staff, agencies, other stakeholders and neighbors; design alternatives; a completed restoration plan; 30% designs; and CEQA documents.	the left.	
Adapt the region's water management approach to deal with impacts of climate change using science-based approaches and minimize regional causal effects.	Prevent greenhouse gases from entering the atmosphere by restoring salt marsh. Salt marshes sequester carbon at a higher rate than most ecosystems.	Restore 7 acres of salt marsh at CDFW's Minhoto parcels.	Acreage of salt marsh restored.	Remote sensing using aerial photography and GIS analysis to quantify acreage of new salt marsh in project area.

Project 8. Central Coast Wetlands Group: Deployment of the Greater Monterey County Regional Water Quality Monitoring Network

The goal of this project is to reapportion and expand a water quality monitoring network to collect real time water quality data at key coastal confluence sites and support the analysis of existing water quality data necessary to define trends and quantify load reductions. The project will be implemented by the Central Coast Wetlands Group at Moss Landing Marine Labs.

We intend to expand the LOBO system, developed by Monterey Bay Aquarium Research Institute (MBARI) to continuously monitor water quality of three watersheds. The current array system has documented the impacts that land uses in the lower Salinas Valley have had on the Moss Landing Harbor, Elkhorn Slough, and the Monterey Bay. The expanded array system will allow coverage of two additional priority coastal confluence locations that drain significant portions of the Salinas Valley (the Moro Cojo Slough and Salinas River mouth).

Two current MBARI LOBO buoy monitoring arrays will be reapportioned at the end of the Gabilan/Old Salinas River and mouth of the Elkhorn Slough, and a new LOBO monitoring station will be deployed within the Moro Cojo Slough. Handheld nutrient probe will be deployed throughout the watershed in partnership with Monterey Bay National Marine Sanctuary's Water Quality Protection Program and the Regional Water Quality Control Board agricultural monitoring efforts. The nutrient load data (pollutant concentrations and flow measurements) generated by this monitoring system will provide the baseline data needed to better document current pollutant loads and systematically report the reductions achieved from multiple projects within the watersheds.

Project 8. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Document the cumulative improvement in water quality achieved by all surface water projects in the Gabilan, Elkhorn and Moro Cojo watersheds.	Temporal water quality data of a quality and quantity necessary to document trends in ambient surface water quality.	Water quality data with sufficient statistical power to document a 10% change in nutrient loading.	Statistically significant temporal changes in nutrient concentrations coming from one or more of the three watersheds.	Water quality data uploaded to CEDEN.
Construct a Water Quality monitoring array to monitor surface water in the three watersheds.	Collection of water quality data of sufficient quality to document changes in water quality.	Water Quality data with sufficient statistical power to document a 10% change in nutrient loading.	Statistically significant temporal changes in nutrient concentrations and data uploaded to CEDEN.	Number of water monitoring samples collected and analyzed for all three watersheds.

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Compile and analyze available water quality data within the Gabilan, Elkhorn and Moro Cojo watersheds to identify water quality improvements.	Documentation of cumulative effect of management strategies on surface water quality.	Document a 10% nutrient load reduction in one or more of the three watersheds.	Collected data of sufficient quantity, quality and statistical power to document a 10% load reduction.	Analyses of water quality data, trends reported, and high performing and problem drainages identified.
Compile information on marine/freshwater interactions for management of brackish water habitat for T&E species.	Description of salinity gradients that currently exist within these coastal confluence systems.	Define salinity gradient parameters (days with low salinity water) necessary to protect brackish water species.	Report that describes annual tidal exchange parameters needed to protect T&E species.	Descriptive analysis of salinity fluctuations of three systems.

Project 9. Save Our Shores: Watershed Protection Program - Annual Coastal Cleanup Day in Monterey County

The Annual Coastal Cleanup Day project in Monterey County, conducted by Save Our Shores, will be monitored by the Save Our Shores staff. The project utilizes citizen volunteers who count and record the number of items collected into specific categories on a preapproved data card provided by the Ocean Conservancy. Individual cleanup site captains collect all the data cards and weigh each bag of trash and recyclables and note items of interest.

On the day of the event, preliminary data on the number of volunteers participating at the event, pounds of trash and recyclables removed, number of volunteers who brought their own reusable supplies, any reports of potential tsunami debris found (if applicable), and any unusual items that were found is reported to the Coastal Commission, the statewide coordinator. Over the next two weeks, the data for each site is collected, QA/QC'd, and entered into our database, which is currently maintained in Excel spreadsheets. Results from all ACC events are then reported to the Ocean Conservancy by December to be entered into their database and for use in their Annual Coastal Cleanup Day report.

Save Our Shores conducts a press release of our results for the Central Coast and make all our raw data available to any requestor and the general public. On our website we also have an Annual Coastal Cleanup Day page, <http://www.saveourshores.org/what-we-do/accd.php>, to promote the event and sponsors, provide an easy way for individuals and groups to volunteer, and provide our data summary. We also prepare marine debris graphs, which are available on our webpage, <http://www.saveourshores.org/what-we-do/cleanup-data.php>, and use our data in our school programs and to educate the general public to increase awareness about the impact of plastic pollution and marine debris on our local watersheds, beaches, nearshore environment, the Monterey Bay National Marine Sanctuary, and the Pacific Ocean.

Project 9. Project Performance Measures Table

Project Goals	Desired Outcomes	Targets	Performance Indicators	Measurement Tools and Methods
Promote and increase Annual Coastal Cleanup day event in Monterey County to protect and enhance local watersheds, Monterey County beaches, and coastal waters of the Monterey Bay National Marine Sanctuary (MBNMS)	Reduce quantity of plastic pollution and other marine debris (trash) in local rivers and streams, coastal waters of MBNMS, and on Monterey County beaches	6,000 pounds of trash and recyclables removed from beaches and local waterways	Total pound pounds of trash and recyclables removed each project year	Submitted data for total pounds of trash and recyclables removed from all cleanup sites
	Expand number of beach and inland sites cleaned each year	20% increase in the number of cleanup sites each project year	Total number of cleanup sites each project year	Count of total number of sites cleaned on day of event
	Increase awareness about beach litter and marine debris in Monterey County	20% increase in number of volunteers recruited each project year	Total number of volunteers attending event each project year	Count number of participants that signed event waivers